

PATHWAYS

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Activities With Paper (II)

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ACTIVITY 8

Roll a sheet of paper to form a tube. Flatten three-fourth of the tube and wind the flattened portion on your finger. Take the finger out and blow into the tube.

What do observe and why is it so?

ACTIVITY 9

Place a ruler on a table with one-third of it sticking outside of the edge of the table. Spread a sheet of newspaper on the table so as to cover the ruler on the table completely. Press out all the air from under the newspaper by stroking it. Hit the part of the ruler sticking out, sharply and suddenly, with another ruler.

What do observe and why is it so?

ACTIVITY 10

Make a tube with 5cm diameter from a newspaper sheet. Close one end of the tube with a kite-paper membrane with the help of cello-

tape. Make a hole at the mid-point of the tube. Hold the tube upright on the table with the open end down. Place a few small paper-balls on the membrane. Speak into the hole in the tube.

What do you observe and why is it so?

ACTIVITY 11

Cut out 25 or more equal-sized rings out of stiff paper (diameter = 4cm, 1cm broad along the periphery). Put a blade cut along the breadth of each ring so that each ring has two loose ends. Stick the one loose end of each ring to the one of the next one so that they form a helix. Hold the paper helix at its loose ends. Bring a few spirals of the helix together and leave them suddenly. Stretch the helix a little more and repeat the activity.

What do you observe and why is it so?

ACTIVITY 12

Make a long tube of 5cm diameter using a newspaper sheet and cello-tape. Make another

thin tube from newspaper sheet and fix transversely to its end a paper disc of 4.8cm diameter. Hold the first tube vertically and put the disc into the tube from its lower end. Ask your friend to hold a sounding tuning fork at its upper end. Move the disc up till you reach the upper end.

What do you observe and why is it so?

ACTIVITY 13

Make two cylinders of different diameters using stiff papers of 20cm x 10cm each. Roll the cylinders simultaneously down a long inclined plane side by side.

What do you observe and is it so?

Solution to Problems in Activities With Paper (I)

Activity 1

Observation : The paper gets pulled out without disturbing the glass.

Reason : It is due to inertia of rest of the glass. The glass is at rest and it would resist any change in its state of rest.

Activity 2

Observation : The paper comes out without disturbing the eraser.

Reason : It is due to inertia of rest of the eraser. The eraser is at rest and it would resist any change in its state of rest.

Activity 3

Observation : The paper and notebook reach the ground at the same time

except when the spread out paper and the notebook are dropped side by side.

Reason : When there is negligible air resistance or no air resistance, all bodies fall freely with the same acceleration due to gravity at that place.

Activity 4

Observation : The paper air-screw spins.

Reason : The kinetic energy of the wind changes to the mechanical energy of the paper air-screw.

Activity 5

Observation : The paper disc spins.

Reason : It is due to convection currents. The cold air comes to the flame, get heated, and therefore, rises up. The kinetic energy of air convection currents changes to the mechanical energy of the disc.

Activity 6

Observation : The paper disc spins.

Reason : The work done in producing relative motion between the air and the disc gets converted to the mechanical energy of the disc.

Activity 7

Observation : The paper disc spins.

Reason : The kinetic energy of wind gets converted to the mechanical energy of the disc.



TRANSPORT

A Topic Study

Janki N. Iyer

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Environmental Studies does not have a specific body of knowledge to be put into the children's heads but aims to develop skills, build up concepts and certain attitudes. Therefore the topic web "Transport" need not be the same wherever or whenever it is taught. The teacher keeps the skills, concepts and attitudes in mind while forming the web. She must also consider the children and their immediate environment. For example the topics which lend themselves to a rural environment will be different from those in an urban area. Our web is given on the next page.

The starting point must be related to the child's experience. In a day school we could start the topic by finding how the children come to school. We could draw a column graph. But ours is a residential school. So we took the children for a survey of road users. They put down the names of vehicles, animals and people who used the road. Then followed a study of wheels. They recorded the number of wheels vehicles like cars, autos, buses and trucks have. They did some reference work on the wheel and its importance. In the web the matter given above is in 1,2,3 and 4.

The children wanted stories once a week. A young teacher, teaching English in the middle school told them stories about explorers and scientists. This led to their questions about the world, the globe etc. We also took advantage of the fact that in the neighbourhood of the school we had a person who had been to Antarctica and had a video tape of the whole expedition. We took the children to his house. Before going they wrote to the Principal asking for permission to go and after getting back they wrote to the gentleman thanking him and expressing their appreciation.

Here are some samples of the children's work. First, a classified list of vehicles.

Vehicles

LAND	WATER	AIR	SPACE
bicycle	ship	glider	spaceship
cars	boat	aeroplane	rocket
jeeps	steamer	balloons	space
bus	kayak	parachute	shuttle
carts	canoe	helicopter	
lorry	yacht	hovercraft	
auto	raft	(close to	
scooter	submarine	land)	
rickshaw	motorboat	hot air balloon	
bullockcart	sail boat	Zeppelin	
hovercraft			
(does not			
touch land)			

Showkath drew a picture of a car and wrote :

This is a picture of a car. It travels on land. It uses petrol. It has four wheels with tyres. It can carry six people from one place to another place. There are many types of cars. Some are small and some are big. Some carry more people and some carry less people. Some cars use petrol and some cars use diesel.

Waseem drew and wrote about a lorry :

This is a picture of a lorry. It carries many things. It uses diesel or petrol. It travels on land. Some lorries are big others are small. It has 6 or 8 wheels with tyres. It carries heavy loads.

Showkath had obviously been a shade more observant. He said in his account, "The lorry is much bigger than a car. A car can fit in a lorry."

TRANSPORT

TRANSPORT

1. **ROAD USERS**
observation of the road, recording
2. **Kinds of transport**
Land, Water, Air
Space
3. **Wheels and vehicles**
4. **The story of the wheel**

5. **MAPPING**
Rough plans of the classroom, the Road, the School Compound, Scale

6. **SCIENCE IN TRANSPORT**
 - a. Friction
 - b. Gravity
 - c. Energy
 - d. Fuels
 - e. Measurement
weight volume
Length distance time
temperature
 - f. Pistons
 - g. Solids, Liquids, Gases

18. **The Story of the School Auto.** Interview with the Principal
19. **The Story of the Indian Railways**
20. **Graphs, Pie charts,** calculation of prices, bus fares etc.
21. **Visit to a Gobar Gas plant**
22. **From a Railway Carriage** Sailing my boat Icarus, Daedalus, witches and fairies.

7. **Visit to a shop**
 - a. Observation of goods, the balance
 - b. Interview the shopkeeper
8. **Making a Ruler.** Estimation of length, Directions
9. **SPACE**
Atmosphere, Rockets and Space Travel, Satellite the Solar System
10. **THE GLOBE**
The Equator, the Continents, Antarctica

15. **MAP OF INDIA**
Rail Routes, the Roads, the Rivers
16. **Observation of a railway ticket, a bus ticket, a carton**
17. **Observation of a battery cell, trade name, trade mark.**

12. **THE EXPLORERS**
Marco Polo, Magellan, Christopher Columbus, Vasco da Gama
13. **DRAWING**
the wheel and its parts. A train, a car, a bus, a lorry, satellite, a parachute.
14. **Lives of Galileo, Newton, Copernicus**

11. **EXPERIMENTS**
Floating and sinking, Condensation, Evaporation, Effect of Heat, Electricity-a simple circuit

Materials which allow electricity to pass through them. Pistons and Cylinders, Sunlight and Shadows

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19th August '87

Dear Sir,

We enjoyed seeing the film. We thought that we were in the Antarctica. The penguins walk like an old man. When we saw the snow scooters we felt like sitting in it and driving it. At first we did not know much about Antarctica. After your explanation about Antarctica, we know more about Antarctica.

You were kind to us and explained the picture clearly. Auntie was also kind and hospitable.

Thank you very much

Yours lovingly
Syed Showkath Ali

Information we got from Dr. Jain's Video Film

Antarctica is the fifth largest continent in the world. It is also the coldest. Antarctica is near the South Pole. In Antarctica the land is covered with ice and snow. There, there are six months of sunshine and six months of darkness. It is also like winter in other countries. There are no trees there.

There are many penguins, seals and skuas. Penguins eat krill.

People from all over the world go to Antarctica to do research. Our country has built a station there. It is called Dakshin Gangotri. The Russians also built a station there. There are many rules for people who go to Antarctica. This place must not be polluted. Rubbish must be burned and the ash has to be taken far away

and thrown. The light there is so strong that special spectacles have to be used. The sky is full of beautiful colours.

This account was illustrated with drawings of a penguin and a seal.

David Horsburgh's book, Learning About Living Bk IV (O.U.P.) provided us with exercises on mapping. The children were introduced to the idea of key, scale and direction. The classroom was measured out in paces and a map was drawn using a scale of 1 pace = 1cm. The position of the door and windows were indicated on the map and their symbols explained in the key.

A city map formed the basis of a question in the final examination paper as well.

As can be seen from item 6, we were able to cover several topics in science. Some of the books we found useful were.

i. Headway Science (Junior Series) Bks. 4 and 5 (Vikas Publishing House) for the study of the solar system, space, rockets, measurement, solids, liquids and gases;

ii. Let's Discover Science Book 4 by David Horsburgh (O.U.P.) for the study of friction, pistons and steam engines.

iii. Energy by J. Wellington [Beginning Science], and

iv. What is Energy by Terry Jennings [The Young Scientist Investigates] both published by OUP were used.

v. David Horsburgh's book-How To Use the Blackboard in Teaching English (Orient Longman) came in useful to show the children how to draw the different vehicles.

Here is Waseem's writing on friction.

Friction

Friction means rubbing. Some times friction helps us. So we make something to have friction. (Example) A car needs friction to come

to a stop. So the tyres are made rough. The blackboard is made rough so that the chalk can write on it.

Sometimes friction stops machines from working. Then we remove the friction. Sometimes we put a drop of oil to make the machine run smoothly.

Factors That Affect Friction

1. Friction depends on the roughness or smoothness. A rough surface has more friction.
 2. Friction also depends on the size of the surface. The larger the surface the more the friction.
 3. Friction also depends on shape.
 4. There is friction between a solid shape and air, also between solid shapes and water.
- He describes an experiment that he tried out.

An Experiment :

We took a chalk box and put sand and stones in it and put it on the ground. We pulled it. We brought a desk and put it on it and we pulled it. Next we put four pencils under the box and pulled it. We learnt that too much friction is there when it is rough. When it is smooth, there is no friction.

The children learnt the names of the different kinds of energy and listed them

Different Kinds of Energy

- | | |
|----------------------|------------------------------|
| 1. Manual Energy | 7. Sound energy |
| 2. Animal Energy | 8. Movement Energy |
| 3. Mechanical energy | 9. Chemical energy |
| 4. Electrical Energy | 10. Atomic or nuclear energy |
| 5. Heat energy | 11. Wind energy |
| 6. Light energy | |

They wrote answers to simple questions.

Who does work ?

1. Man does work
2. Animals do work

(These were illustrated by drawings of men carrying things in their hands and of an elephant carrying a load.)

3. Machines do work.

We can't make energy or destroy it. We can change one kind of energy into another kind of energy.

Q. What is work ?

When a push or a pull moves anything, work is done.

Among other science activities were those involving measurement. A narrow strip of chart paper when graduated became a ruler to measure lengths. Other exercises involved children in the measurement of physical quantities like time, weight, volume and so on.

As part of their study of space travel and rockets, satellites came up for investigation. Along with a drawing, Showkath wrote :

This is a picture of a satellite. Satellites find out information about space, weather and any other information. People do not travel in satellites, but there are instruments which work all the time.

Satellites make use of solar cells which use the energy from the sun.

The children enjoyed making models of Stephenson's Rocket (an early steam engine) based on details given in Learning About Science Bk. 4.

The First Steam Locomotive

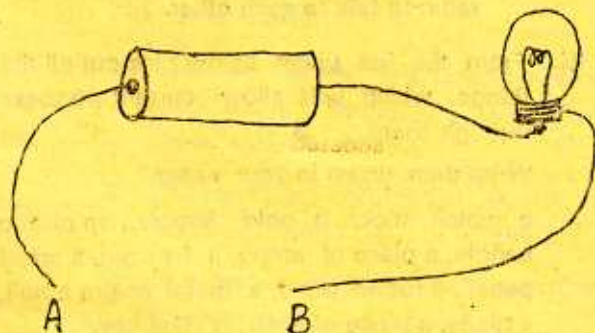
George Stephenson was born in Newcastle in 1781. He was a maker of engines and a mechanic. He worked for a coal mining company. He designed many steam locomotives which worked well.

The Liverpool and Manchester Railway asked different people to make locomotives. Five people tried. Stephenson won a prize of £500 for his 'Rocket'. It travelled at a speed of 39 km per hour. On September 15th, 1825, the railway line between Liverpool and Manchester was opened.

The First Steamboats

When the steam train was making its trial runs, the American Robert Fulton was testing his first river boat moved by a steam engine. The first voyage was in August 1807. Soon steam replaced sails in boats, war ships and ships travelling on oceans.

A simple circuit allowed children to investigate the electrical conductivity of materials. Apart from carrying out the trials, results were recorded in tabular form.



In the drawing given above, we have a way of connecting the wires, so that we can find out which materials allow electricity to pass through them. There is no connection between A and B. We put different materials between A and B. Some materials allowed the current to pass through them. Then the bulb burned. If the current did not pass, the bulb did not burn.

Materials	Allowed current to pass	Did not allow
1. A piece of chalk	✓
2. A gold bangle	✓
3. A piece of string	✓
4. A small silver chain	✓
5. A string of tulsi seeds	✓
6. Avanti's metal bangle	✓
7. Plastic bangle	✓
8. Slide pins	✓
9. A blade	✓
10. Pins	✓
11. A nail	✓
12. Steel key	✓
13. Match stick	✓

Torchlight cells, easily available, were objects of careful observation.

The Battery Cell

Observation : The battery cell has two ends, the positive and the negative. The plus sign stands for the positive and the minus sign for the negative. Eveready is the trade name of the battery cell given to us. It also has a trade mark which shows a cat jumping through the number nine. The power of the cell is given as 1.5 volts (The unit of measurement of electricity is the volt.) The name of the company which made the cell is given on the cells. It is UNION CARBIDE INDIA LTD. The cost of the cell is given as Rs. 3. 90.

An outline map of India was used to mark out some important rail routes, Secunderabad being the zonal headquarters of the South-Central Railways, some information about the Indian Railways was collected.

The Indian Railways

It is the largest system in Asia and second largest in the world. It covers 61,000 kms. As it is a large system, it has been divided into nine zones.

Zones	Headquarters
1. Northern,	New Delhi
2. Western	Bombay
3. Central	Bombay
4. Eastern	Calcutta
5. South Eastern	Calcutta
6. Southern	Madras
7. North-eastern	Gorakhpur
8. South-Central	Secunderabad
9. North-east frontier	Gauhati

A bus journey provided an opportunity to study the tickets issued.

A Journey By Bus

On Sunday, the 21st of June, we went on an outing. We went to the Birla Temple, the Public gardens and the Museums. We went by public bus run by the A. P. S. R. T. C.

(Two bus tickets of Rs. 1.40 and Rs. 0.80 were collected and pasted in the note book).

What can we find from the bus ticket?

We can find out the cost of the ticket. We can find out whether the bus is a city bus or a district bus. We can also see if the bus is an express bus. The serial number of the ticket is also given. We can also find out at what stage the passenger got in.

The whole unit was rounded off by a play staged on the "Annual Day" when all the children of classes 4 and 5 participated. The play was entitled "Grandfather's birthday". Grandfather's 80th birthday attracts his sons, daughter, grandchildren and others. They relate how they travelled. The grandson who comes from America brings Rakesh Sharma who tells everyone about his view of the world from space.

Our topic had led the children through several areas of the curriculum, and their learning was tested in the Annual Examination. Their question paper is reproduced here.

VIDYA NIKETAN

Hyderabad-7

Annual Examination—March 1988

Class IV & V

Time : 2 hrs

Sub : Environmental Studies

Marks : 100

(Reading Time 10 minutes)

I. Answer in one or two words : 20

- What is the most important discovery which helped man to travel?
- Which are the two liquids used in a maximum and minimum thermometer?
- Which is the satellite of the earth?
- Which planet has a ring around it?
- Which is the closest planet to the sun?
- Which explorer went to the Court of Kublai Khan?
- Who found a new Sea route to India from Europe?
- Who gave the Pacific Ocean its name?
- Which islands did Columbus discover?
- What is the name of the first steam locomotive made by George Stephenson?

II. Give reasons for the following : 10

- The Sun's gravity is greater than the Earth's.
- It is easier to write on the black board than on a smooth floor.
- The tyres of cars are not smooth
- The railways are the cheapest method of land transport
- People on the Moon need to use the radio to talk to each other.

III. From the list given below pick out all the things which will allow current to pass through them. 3

Write them down in your paper.

a match stick, a gold bangle, a plastic bangle, a piece of string, a hair pin, a small pencil, a rubber band, a metal chain, a nail, a blade, a piece of chalk, a steel key.

IV. 1. What are the two movements of the earth? Which of them causes day and night? 3

2. What did Galileo discover by looking through the telescope? 3

3. Who was the scientist who discovered gravity? 2

4. How is the behaviour of molecules in a gas different from that of the molecules in a solid? 3

5. Name four kinds of energy and give one example for each. 8

V. Sunil's temperature is 37°C

Lata's temperature is 38°C

Sita's temperature is 39°C

Who has fever?

Who has normal temperature? 3

VI. Some things are measured in litres or millilitres. Pick out their names from the list given below and write them on your paper. 3

potatoes, milk, wheat, rice, petrol, kerosene, soap, coffee powder, coconut oil, orange-juice, water.

VII. Match the following : 5

- | | |
|-----------------|-------------------------------|
| a. The orbit | helps us to do work |
| b. The piston | is free |
| c. Solar Energy | have no light of their own |
| d. Energy | is the fixed path of a planet |
| e. Planets | is inside a cylinder |

VIII. Fill in the blanks : 5

- The first Railway train in India ran from to on April 16th 1853.
- Chittaranjan Locomotive Works made and engines.
- The headquarters of the South Central Railway is

IX. [This question is on a diagram showing stop-watches and requires the children to demonstrate the ability to read intervals of time.]

a. b. c.

X. Study the map given to you (on the separate sheet) and answer the following questions. 10

- In which direction would a person on the Causeway travel to reach the Kali temple.
- Name any two roads which are from North to South.
- Name any two roads which travel from East to West.
- In which direction would a person on Mahatma Gandhi Road have to travel to reach the railway bridge?
- How long is Kasturba Road? Use the scale given and a ruler to find out.

XI. Say what the following colours are used for in a map : 6

brown blue green

XII. On the map given to you mark : 10

- | | |
|--------------------|----------------------|
| 1. The Arabian Sea | 2. The Indian Ocean |
| 3. The Himalayas | 4. The Bay of Bengal |
| 5. Andhra Pradesh | 6. Tamil Nadu |
| 7. Maharashtra | 8. Uttar Pradesh |
| 9. Kashmir | 10. Gujarat |

Apart from these facts we had led the children through exercises designed to inculcate the following skills in them.

I. Basic Skills

- | | |
|----------------------|----------------|
| 1. Sensory awareness | 2. Numeracy |
| 3. Written word | 4. Spoken word |
| 5. Art | 6. Music |

II. Study Skills

- | | |
|--|--|
| 1. Observation | 2. Experimentation |
| 3. Statistical Representation | 4. Classification |
| 5. Learning to locate—mapping, interpreting maps | 6. Language—
a) Factual writing
b) Imaginative writing |

III. Social Skills

- | | |
|--|---|
| 1. Communication | * Interviews
* Letter-writing
* Speaking to their own class
* Speaking to the school in the assembly |
| 2. Cooperation through team work, sharing of books, information, knowledge, working together on wall charts, projects, gathering reference material. | |
| 3. Respect for the environment. | |



Story-Telling

From time immemorial our mothers and their mothers, in turn, have been telling stories to little ones. But why? Children come running to listen to a story. Why? Yes, there is an answer to this. Stories provide enjoyment to little ones. They experience the chain of events in the story and identify with the characters. The story has a beginning and an end. A story bridges the gap between the child and its surroundings. For those few moments the child slips into the world of fantasy which is immensely enjoyable.

Stories can be used by a teacher in numerous ways. Like all habits, the reading habit also takes root in early childhood. Stories help children stretch their imagination; foster their reasoning ability and vocabulary. Children can wait patiently to listen to a story. Social values and attitudes can be conveyed through stories. Desirable traits like tolerance, sharing, sympathy, can be conveyed indirectly through stories, so as to avoid a feeling that they are being imposed on the children by adults. Stories help increase the attention span and concentration of children. Becoming aware of the sequence of events in a story enhances their observational skills and children begin to understand the concept of time. But all these are subordinate to the main function of storytelling—enabling children to enjoy stories for their own sake.

Children are egocentric by nature. They see themselves as the centre of their world and cannot easily appreciate the point of view of others. They enjoy stories involving familiar objects like aeroplanes, cars, toys or animals, and children doing the things they do in their own lives. Since the children are at a pre-operational stage and do not work at the abstract level, they will understand stories with clear, bold illustrations—preferably in real-life colours to which they can relate easily. They like listening to all kinds of stories—fantasy, plots, informative, realistic, adventurous, folk and fairy

tales. The television serials, He-Man and Spider-Man, attract children like a magnet attracts nails. This is mainly because each episode has a plot, action, is simple to understand and is animated in a most fascinating way. Most of all they show interest in stories depicting action, love and affection. They get tickled if they hear a story of a 'Mota Lala' or 'Mr. Long Man' or of 'Chitku-Mitku'. If a story has catchy words of repetitive nature like "Chi! Chi!", "Furr, Furr, Furr", "plop, plop, plop", "Aakchee, Aakchee", the children will never forget the story. Naughty and humorous characters fascinate them, but unfortunately there are very few books which have such funny characters.

It is not merely enough to choose the right kind of story for children. An equally important factor is how the story is told. The style of telling or reading a story is most important if preschoolers are to follow the story or gain information from it. Reading aloud is often mechanical and evokes no emotions. Oral narration involving human contact as well, evokes emotions. Sitting close to share a book with another person provides children with a feeling of security. A story, when told, should be thoroughly familiar and should be told in a conversational tone, using words which the children can understand. Unfamiliar objects and words need to be explained. The narration should be slow, as children do not appreciate a story told in a hurry.

It is important to present the story when the children are relaxed and are able to pay attention. If necessary, create a mood by introducing quiet conversation and other activities which are calming and conducive to attending a session of story-telling. Involve the children in the story as this gives it more life. For example, if the action takes place on a rainy day, let the children move their hands to show the rain coming down. In the story of the three little

pigs, let the children make the sound of the pigs—"grunt! grunt!". Let them demonstrate the walking and running movements of the pigs. The children will remember the meaning of the events more easily as a result of these moments of direct experience. The basic reward of characterization is fun, but along with it, we are stimulating their imagination and their intellect.

While narrating the story, modulation of the voice is important, but without exaggerated dramatics which can confuse the children. When ending a story, never point out morals or draw applications. Let the children ask questions. In turn ask them questions to encourage participation and to check whether they have understood the content of the story. Children often come up with comments which they would otherwise never have made in public. One little one told me, after a session of story-telling, "Madam, मुझे डर नहीं लगता, मैं तो toilet अकेले जाता हूँ।" Another said, "Madam, मुझे डर वाली story नहीं अच्छी लगती।"

There are different ways to relate a story :

- i. **Without using any aids :** In such a story, the voice and its modulation are most important. The story should be short.
- ii. **On the Blackboard :** Children are simultaneously doing three things—listening, watching and thinking.
- iii. **Using Flash Cards :** The pictures must be large and clear, easily identifiable, and they help focus the children's attention.
- iv. **Using a Flannel Board :** The illustrations must again be easily identified. The advantage is that more than one can be kept on view at a time and their positions on the board changed as the story progresses.

The illustrations made for the above two methods, can easily be put away, for re-use.

- v. **A Picture Story Book :** If it is large and has colourful illustrations, it is an excellent adjunct to the story-telling session. Small books are less easily shared with the class.

One of the stories my students enjoyed immensely was *The Three Little Pigs*. It was told in my book without a text, using colourful, bold and clear illustrations, and I give below a brief outline of some associated activities.

- i. The story was shown to the children. Then they were asked to describe each event of the story. Once they finished, the whole story was narrated by me, all along helping them to converse and express their feelings.
- ii. Different movements relating to the story were enacted. The children showed how the pigs sneaked into the house slowly, without making a noise, how the tins fell—drumb, drumb, drumb, how one pig fell in the tin—plop! plop! plop! how Mr. Longman came running with a stick, how the pigs ran out of the house into the washing tub and then how they danced.

The emotions attached to the events were acted out: the happy pigs entering the house, the angry Mr. Longman, the pigs laughing to see each other coloured.

The children drew the pigs. String puppets were made and the story was enacted. Children dramatized the story, taking on the role of the three pigs and Mr. Longman. This was done most enthusiastically. It not only brought out their talents but elicited response from the shy and inhibited children as well.

All in all, it was a wonderful story-involving my students and me in a happy partnership.

Mr. Rattan Malik
Ramjas School,
R. K. Puram, Sector IV
New Delhi-110 022

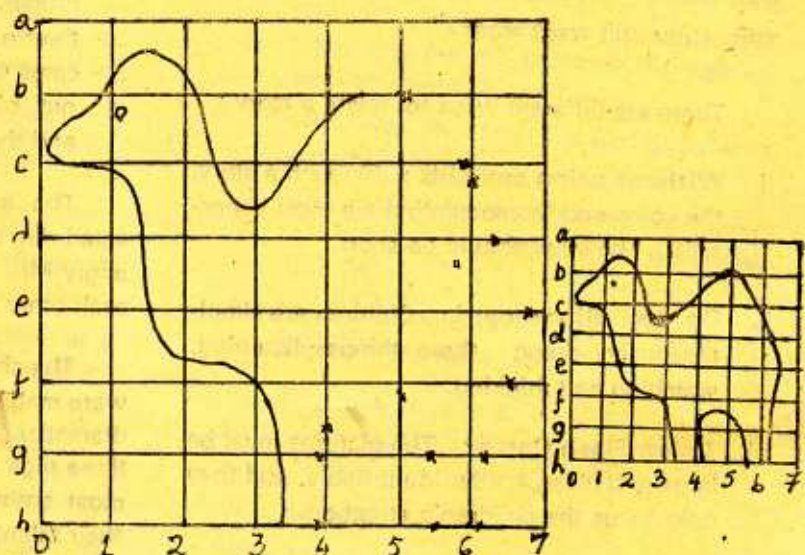
FUN AND GAMES FOR PRE-SCHOOLERS

Are you getting bored with the ready-made games you have in your pre-school classroom? Here are some animal outlines with which you can evolve several new games on your own. Some ideas are given below. Start with these and then let your imagination take over.

First, trace out these shapes on to thick cardboard. Attractively painted (try poster paint mixed with a little gum, and finish with enamel or clear shellac), they will provide a mini-zoo for the children to play with. For greater stability fix the animals on to a small flat wooden base. Where that is difficult, a small cardboard box (have you thrown away all the containers in which you bought medicines recently?) may serve just as well. If your school has a carpentry workshop, the animal might even be cut out of throw-away pieces of wood or plywood. In all cases, remember to use a file and smoothen the edges. This makes the toys safer to handle.

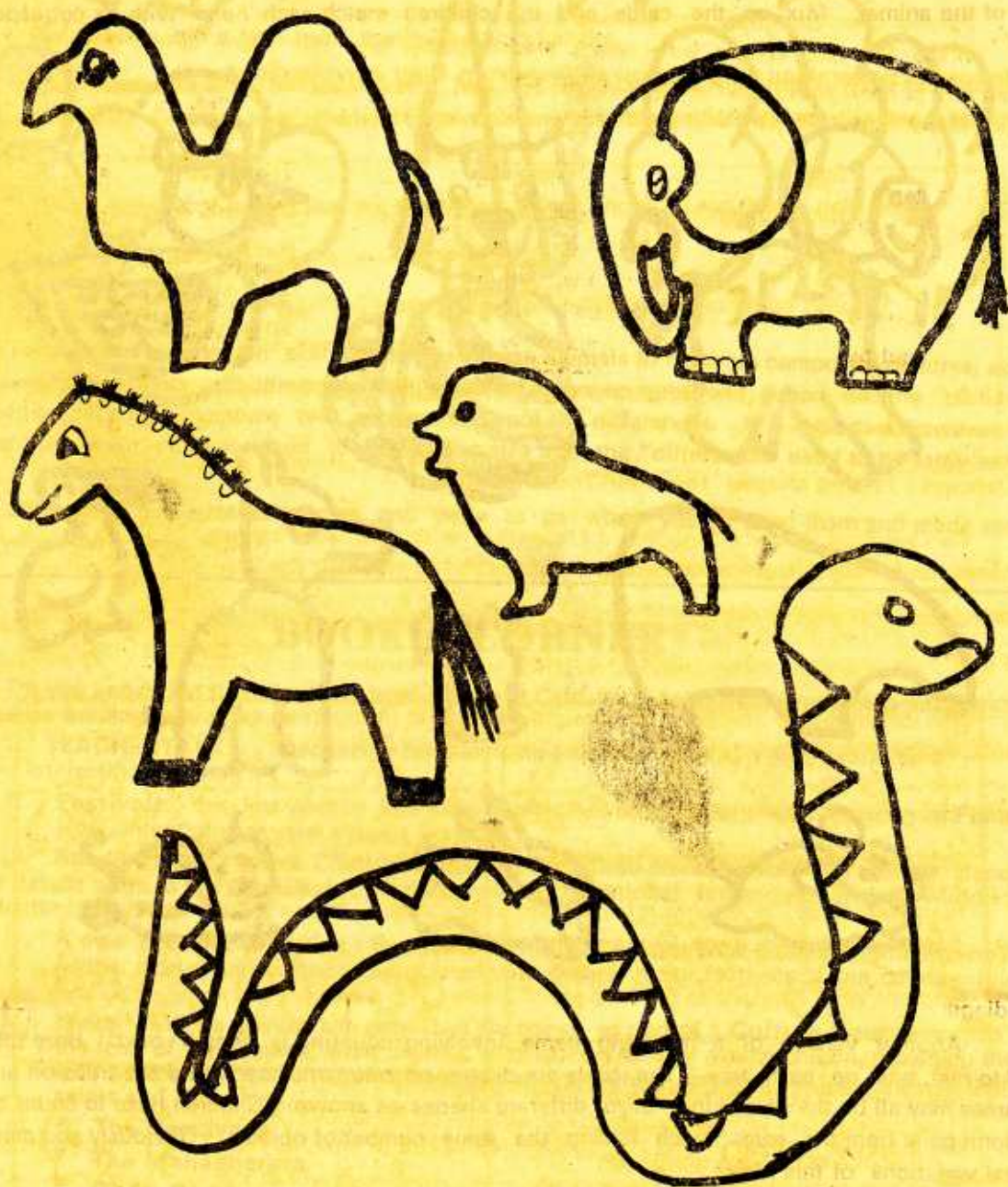
The cardboard cut-outs themselves can serve as stencils. That opens up endless possibilities. Draw outlines which the children can colour in. Cutting and pasting exercises can follow.

Make up sets of cut-outs, or cards, on which animals of different sizes have been drawn and coloured in by you. Children can be asked to arrange these in order..... from the smallest to the biggest or the other way round. For readers who have problems in drawing free-hand, the diagram given here shows how a grid made up of squares can be used to enlarge any outline to a desired size.



Enlarge the drawings given here to about 15 cm height or more. Trace them on to stiff white mount board, the kind used for mounting photographs. This is available in many large stationery shops. It is most often white on one side and coloured pink or yellow on the reverse. Once the picture is ready draw light pencil guidelines to help you cut it up into a jigsaw. If your

scissors are not effective in cutting up the mount board, use a small chisel. Place its sharp flat edge on your line and hammer lightly to cut the board. After the pieces are separated, their edges must be sandpapered or filed to make them smooth.



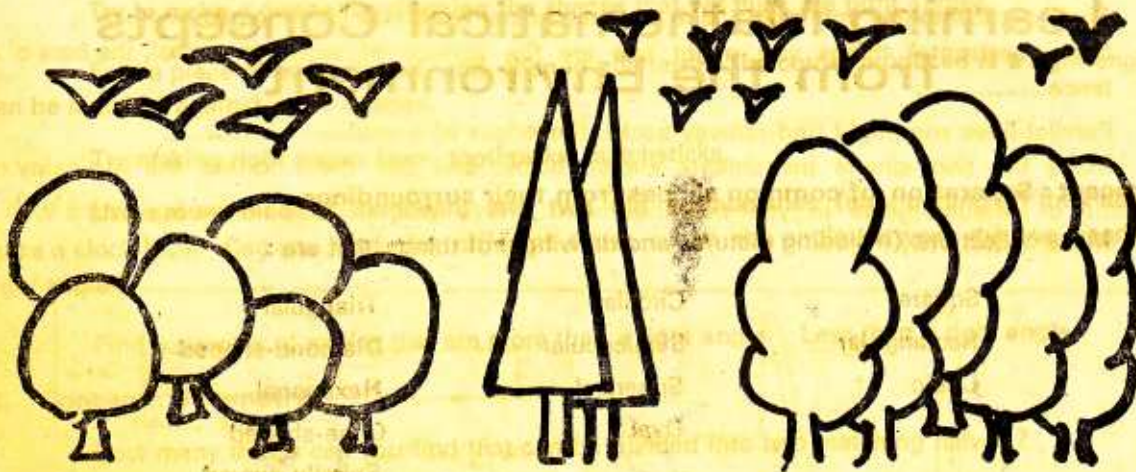
To sharpen the observational skills of the students make sets of four to six cards each, all of them bearing the same picture, except for one. This is the odd one out, which the children have to spot. In making this card, you would leave out or add one small detail. For example if you make a series of rats, perhaps one picture could have a rat with two tails or no tail at all.

Another interesting game can be played in this way. Make a set of cards, all of the same size, each bearing the picture of a different animal. You could use, for example, the monkey, the tiger, the hen and the dog in the next figure of this article. Position the pictures on the cards in such a way that each card can be cut into two parts—one which will have the body and the other, the head of the animal. Mix up the cards and the children match each 'head' with its corresponding 'body'.



Another version of a matching game involving counting is shown next. Here the birds need to rest, one on each tree. The birds are drawn on one set of cards and the trees on another. The trees may all be the same kind, or of different shapes as shown. Children have to count quickly and form pairs from the cards, each having the same number of objects. Obviously you can make several variations of this idea :

- * each monkey to pick up a banana
- * each lion to have a cage
- * each cat to catch a rat
- * each hen to lay one egg and so on.



To sharpen observation skill further, use these animals to make up composite pictures, each having several elements. Children can be asked to answer questions based on the pictures. They could be asked to compare two pictures and spot the differences. It is important however, to remember that these pictures need to be large in size and the "differences" need to be fairly easily visible.

Start off with this lot of games and write to us when you've used them and made some more of your own. Have FUN ! ●

BOOKS CORNER

Do you know that there is a Teachers' Centre at Calcutta ? Apart from conducting programmes for in-Service training they produce :

i. **TEACHERTALK :-** a magazine for practising teachers. Annual subscription Rs. 9/ :

And other interesting material :

ii **Festivals: -** by Uma Ahmad and Katie Dalal. Full of ideas for theme teaching at Primary level, integrating several subject areas.

iii. **Reading: -** by Ayesha Chatterjee. Booklet and flash cards, suitable for primary classes. For more details write to the Coordinator, The Progressive Educational Techniques Society Middleton Row, Calcutta- 700071.

iv. A new E. P. G. publication : **Festivals of India-** Contains back ground information on the myths, stories and customs associated with several major festivals of our country. Price: Rs. 12/-

v Bharatiya Vidya Bhavan has published six books as part of a **Culture Course** written in the form of easily-read, short lessons, they can be read by young children, providing them with a large number of stories from Indian mythology as well as the lives of Indian saints and great men.

vi. * **The Ramayana**

* **The Mahabharata**

* **Gods, Demons and others**

by R. K. Narayan. Suitable for adults and older students. Vision Books, 36 C Connaught Place, New Delhi - 110001 Price Rs. 95'00 per set of three books.

vii. **Computer - A Child's Play :** by Dharma Rajaraman, Prentice-Hall of India Pvt. Ltd. Explains in simple language the parts of a computer system, how they work and simple concepts of programming. Children of classes VI to VIII will enjoy this book, especially its conversational style, set in a classroom situation. The clear easily-read print and neat lay-out are particularly appealing. Price : Rs. 15.00. ●

Learning Mathematical Concepts from the Environment

1. Concept : Separation of common shapes from their surroundings

Make collections (including pictures and drawings) of things that are :

Square

Circular

Triangular

Rectangular

Semicircular

Diamond-shaped

Cubic

Spherical

Hexagonal

Oval

Cone-shaped

Spirally-curved

'I Spy' games related to different shapes can be played during expeditions outside the school, on the way to class and on the way home.

2. Concept : Fitting shapes together-Tessellation

Can you find some things that fit together with no spaces between ? Tiles, bricks, pieces of a honeycomb, shapes in a cement trellis

What sort of things have spaces between even when they are close together ? A stack of round tins, balls placed in a box, eggs in a basket

Discussion topic : Things with straight sides that fit together without spaces between, such as books on the shelf, boxes, bricks in a wall

a. Concept : Amount of space between shapes

How can we find out how much space is not filled by the pebbles in a jar ?

Pour water into the jar until it just covers the pebbles. Then carefully drain it into a measuring jar. Repeat this several times and find the average.

Find out what happens to the amount of water if the pebbles are replaced by smaller stones, very fine gravel ?

b. Concept : Amount contained by different shapes

Use a similar method to find out whether round tins or square tins of the same height contain more water.

3. Concept : Angl

If you look carefully you can find some different kinds of corners made when two lines meet. We call these different types of corners ANGLES.

What sort of angles can be found most easily ? where ? (Right angles).

Try to make a device for checking the shapes that we think are right angles.

Fold a piece of paper in half and then in quarters. The corner produced is a right angle and can be matched against other shapes.

Try making right angles from toothpicks, matchsticks.

Use a round piece of cardboard and two old toothbrushes (after cutting off their heads) to make a clock face. Can you read the different times when the angle between the two needles is a right angle?

Find examples of angles that are more than a right angle. Less than a right angle

4. Concept : Symmetry

How many things can you find that can be divided into two matching halves?

In many ways? (Radial symmetry)

An apple cut in half, a wheel, certain flowers.....

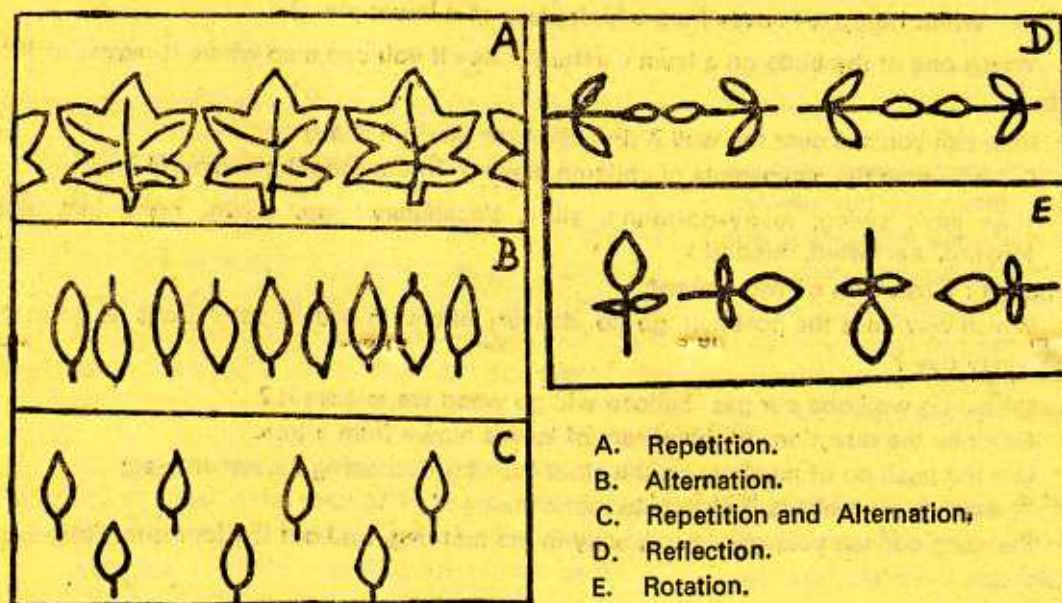
in only one way?

A butterfly, a pair of scissors, a leaf.....

Concept : Asymmetry

Can you find somethings that cannot be divided into two matching halves?

Can you produce patterns by using symmetrical shapes in repetition, reversing them, alternating them, rotating them?



5. Concepts : Verticality, Horizontality, Parallelism (always the same distance apart)

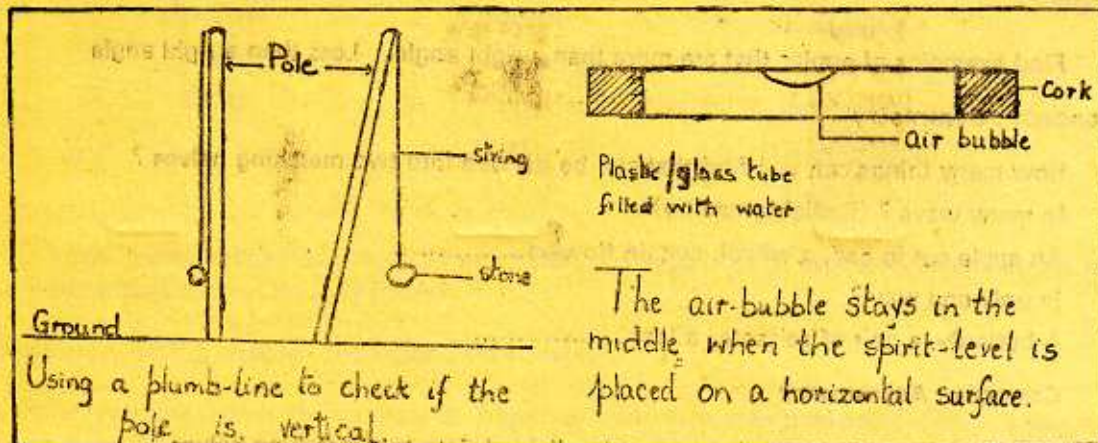
Some things stand upright, others are fixed in different positions. Shall we go out and see what we can discover about this?

Some vertical things you might see are lamp posts, telephone poles, pipes.....

Some horizontal things you might see are the surface of water in a pool, the bars of a fence.....

Parallel lines you might find-railway tracks, the edges of a road.....

Make the two simple instruments shown below and use them to test the verticality or horizontality of various objects in your neighbourhood. Have you noticed a mason building a wall? He uses one of them. Why?



6. Concept: Motion-as a change in the position of an object

Watch carefully and see if you can tell me exactly what happens to a ball

a) As we throw it and catch it (it is pushed from one hand to another pair of hands)

b) When I drop it (moves from a high place to a lower place)

Watch one of the birds on a lawn carefully. See if you can map where it moves as it changes its position.

How can you see over the wall? (By climbing up on a chair)

Can you map the movements of children playing in the school playground?

(See saw, swing, merry-go-round, slide. Vocabulary: up, down, right, left, high, low, forward, backward, around.)

7. Concept: Direction of movement

Which way does the postman go to deliver letters in your street? Does he go in the same direction every day?

Where do we hope our gas balloon will go when we release it?

Describe the directions of movement of leaves blown from a tree.

Use the position of numbers on the clock face for describing movements-eg;

"I must move towards 7 o'clock to reach the tree".

Standing outside your classroom, early in the morning, find out the four directions-East, West, North, South.

Use the compass points to describe. a) The position of the Sun at different times of the day. b) The direction of the shadow of a tall stick at different times of the day.

Some of the landmarks seen during outdoor excursions.

[Adapted from Using the Environment 1 Early Explorations A Unit for teachers published for the Schools Council, U. K. by Macdonald Educational and reprinted from PATHWAYS April 1979 issue]